Bioactive compounds from natural products with antidiabetic potentials

This series consists of review articles focusing on bioactive compounds with antidiabetic potentials from natural products, especially herbs and edible vegetables in tropical region. The articles revealed the significant effects of the plant extracts in modulating glucose and lipid metabolism. The series meets the interest of researchers as the existing drugs do not show long term promising effects on diabetic symptoms. Medical cost for the management and treatment of diabetic patients is kept increasing annual. Therefore, intensive studies have been actively carried out to look for alternative solution for the chronic diseases. This includes the application of plant based bioactive compounds extracted from herbal and vegetable plants.

The natural bioactive compounds or phytochemicals would have less adverse effects than the side effects attributed to synthetic drugs. There were studies proved the antihyperglycemic effects of *Eurycoma longifolia* which is known as the king of herbs in South East Asia. The decoction of the plant roots is usually prepared by indigenous people as ethnomedicine to treat many illnesses. Recent scientific studies also proved the pharmacological significance of the herbal extracts against hyperglycemia. In particular, the positive result showed by eurycomanone which is a C20-quassinoid as the marker of the herb. Researchers reported the quassinoid rich fraction promoted the antihyperglycemic activities.

Another traditional herb that is commonly used as culinary spices with antidiabetic potentials is Curcuma species. Curcuma is a genus of plants in the ginger family and it is also native to South East Asia. The bioactive compounds from Curcuma is curcuminoids composed of curcumin, demethoxycurcumin, and bisdemethoxycurcumin. Its phytochemical composition is strongly affected by the factors of geographical origin, and thereby influencing the antidiabetic property. Anyhow, previous studies demonstrated the antidiabetic property of curcuminoids would be better, at least comparable with drugs. The only drawback is the bioavailability and stability of curcuminoids, and therefore studies have been focused on encapsulation of this thermal sensitive and lipophilic plant constituents.

Besides herbal plants, the antidiabetic potentials of few vegetable plants from the Cucurbitaceae, Solanaceae, and Amaranthaceae families are also included in this series. Different classes of phytochemicals such as alkaloids, terpenoids, phenolics and flavonoids, as well as saponins from edible plants have been reviewed for the reported antidiabetic potentials. The rationale has been supported with the plausible mechanisms in inhibiting glucose uptake reported by previous researchers. Possibly, the phytochemicals act as inhibitors to inhibit starch digestive enzymes such as α-glucosidase, α-amylase and dipeptidyl peptidase IV. The phytochemicals may also promote insulin secretion by inhibiting ATP-sensitive potassium (ATP-K+) channel and/or activating peroxisome proliferator-activated receptors-gamma (PPAR-γ) to reduce hyperglycemia. This series has compiled results from previous studies and critically reviewed the findings to provide an insight of bioactive compounds from herbal and vegetative plants for their antidiabetic potentials.

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Footnote

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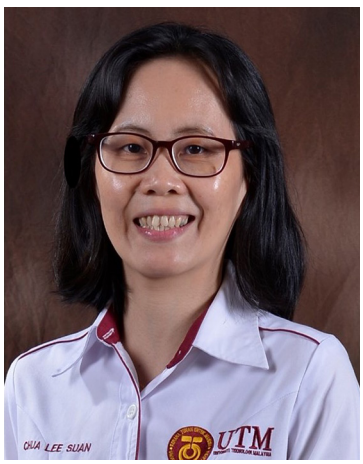

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